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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,846	11/08/2006	Makoto Iwai	811_107	3664
25191	7590	02/25/2010		
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EXAMINER				
RAO, G NAGESH				
ART UNIT		PAPER NUMBER		
1792				
MAIL DATE		DELIVERY MODE		
02/25/2010		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/594,846

**Applicant(s)**

IWAI ET AL.

**Examiner**

G. NAGESH RAO

**Art Unit**

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 December 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6 and 8-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/GS/US)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly

owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1) Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US Pg Pub 2006/0051942).

Sasaki 942 pertains to a method of fabricating a Group III Nitride single crystal whereby a Sodium metal flux is utilized, and the nitride crystal is grown in atmosphere comprising a gas mixture of nitrogen gas under a temperature range of 100<sup>0</sup>C to 1500<sup>0</sup>C and a pressure range of 100Pa - 200MPa (which falls within the 300-1200 atm range) (See Abstract, Sections 0026-0032).

However Sasaki 942 does not explicitly disclose the pressure range breakdown as claimed wherein the total pressure range comprises of a partial pressure range of 120-600 atm for nitrogen.

It would be obvious to one having ordinary skill in the art at the time of the present invention to notate that this limitation is a resultant effective variable limitation and that it would be intuitively deduced to have comparable high nitrogen partial pressures as part of the total pressure scheme, in order for the effective growth of the GaN to occur.

2) Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US Pg Pub 2006/0051942) in view of Sarayama (US Pg Pub 2002/0175338).

From the aforementioned rejection Sasaki 942 pertains to a method of fabricating a GaN single crystalline material. However Sasaki 942 fails to disclose an elevating crucible containing said flux until a seed crystal contacts said flux.

In the same field of endeavor pertaining to GaN single crystal growth Sarayama 338 discloses a means of elevating a crucible towards the seed crystal (See Figs 15A and 15B Sections 0151-0164) which as disclosed as a means of effective growth and facilitation of the nitride crystal from a seed base.

It would therefore be obvious to one having ordinary skill in the art at the time of the present invention to incorporate the teachings of Sarayama 338 with that of Sasaki 942 in order to facilitate an efficient and high quality means of GaN single crystal growth.

3) Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US Pg Pub 2006/0051942) in view of D'Evelyn (US Pg Pub 2006/0096521).

From the aforementioned rejection Sasaki 942 pertains to a method of fabricating a GaN single crystalline material. However Sasaki 942 fails to disclose using a system for hot isostatic pressing (HIP).

In the same field of endeavor pertaining to GaN single crystal growth, D'Evelyn 529 discloses a means of using HIP which can enable a reduction of crystal defects in the grown crystal (See Abstract, 0009-0010, and 0024-0028).

Thus it would be obvious to one having ordinary skill in the art at the time of the present invention to incorporate the teachings of D'Evelyn 529 with that of Sasaki 942 in order to facilitate higher quality and defect-free/reduced crystal structures.

4) Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarayama (US Pg Pub 2002/0175338) in view of Sasaki (US Pg Pub 2006/0051942).

Sarayama 338 discloses a means of elevating a crucible towards the seed crystal (See Figs 15A and 15B Sections 0151-0164) which as disclosed as a means of effective growth and facilitation of the nitride crystal from a seed base. Whereby the flux in the crucible is driven up towards the seed crystal and downward to separate the seed crystal from the flux.

However Sarayama 338 fails to disclose the claimed atm and temp range for processing and fabrication of the GaN single crystal material.

In the same field of endeavor pertaining to GaN single crystal growth, Sasaki 942 pertains to a method of fabricating a Group III Nitride single crystal whereby a Sodium metal flux is utilized, and the nitride crystal is grown in atmosphere comprising a gas mixture of nitrogen gas under a temperature range of 100<sup>0</sup>C to 1500<sup>0</sup>C and a pressure range of 100Pa - 200MPa (which falls within the 300-1200 atm range) (See Abstract, Sections 0026-0032).

It would be obvious to one having ordinary skill in the art at the time of the present invention to notate that this limitation is a resultant effective variable limitation and that Sarayama 338 benefits from the incorporated teachings of Sasaki 942 in order to facilitate higher quality growth of GaN single crystalline material.

5) Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sarayama (US Pg Pub 2002/0175338) in view of D'Evelyn (US Pg Pub 2006/0096521).

From the aforementioned rejection Sarayama 338 pertains to a method of fabricating a GaN single crystalline material. However Sarayama 338 fails to disclose using a system for hot isostatic pressing (HIP).

In the same field of endeavor pertaining to GaN single crystal growth, D'Evelyn 529 discloses a means of using HIP which can enable a reduction of crystal defects in the grown crystal (See Abstract, 0009-0010, and 0024-0028).

Thus it would be obvious to one having ordinary skill in the art at the time of the present invention to incorporate the teachings of D'Evelyn 529 with that of Sarayama 338 in order to facilitate higher quality and defect-free/reduced crystal structures.

### ***Response to Arguments***

6) Applicant's arguments with respect to claims 1-10 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

7) The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Please see PTO-892.



Any inquiry concerning this communication or earlier communications from the examiner should be directed to G. NAGESH RAO whose telephone number is (571)272-2946. The examiner can normally be reached on 8:30AM-5PM (INDEPENDENT FLEX SCHEDULE).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael KORNAKOV can be reached on (571)272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Art Unit: 1792

/G. Nagesh Rao/

GAU-1792

Patent Examiner